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NASA TECH BRIEF

Hydrostatic Force Used to Handle Outsized, Heavy Objects

The problem:

To develop an economical method, within present technology, of transporting and handling very large, heavy objects.

The solution:

When there is access to a navigable waterway, a specially fitted barge can be used to load and transport the objects to a dockside site. At the site the barge itself can be used to lift, rotate, and position the objects.

Typical functions which can be accomplished by water buoyancy are illustrated by the proposed handling of a very large monolithic solid rocket motor 200 inches in diameter, 138 feet long, and weighing approximately 1800 tons. The rocket would be transported on a barge to a dock from the manufacturing facility. By filling the dock with water, the rocket and the barge would be positioned in relation to a dockside support. The rocket would then be cradled horizontally on intermediate support pedestals atop the dock sidewalls. The dock would be emptied of water, lowering the barge and leaving the rocket supported on the intermediate support pedestals. Intermediate lift towers on the barge would be erected to engage the rocket. The dock would again be filled with water, raising the rocket an additional 44 ft. At this point, pivoting trunnions on the rocket would be engaged with trunnion towers on the sidewalls of the dock. The rocket would be rotated to a vertical position by leaving one of the intermediate lift towers connected to the rocket while the water level in the dock was lowered. By using a similar procedure, the launch platform and aft engine components would be attached to the rocket and the assembly raised to a launch position. A special flame deflector barge would be floated under the assembled rocket for launch.

Notes:

1. A guide column with followers is required in the dock facility to maintain the stability of the lifting barge when the center of gravity of the barge and its load is above the barge's metacenter.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Headquarters
   National Aeronautics and Space Administration
   Washington, D.C. 20546
   Reference: B67-10167

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: G. W. Craft and A. W. Starkey
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under contract to
NASA Headquarters
(HQ-90)

Category 05